

Canadian Translation of Fisheries and Aquatic Sciences

No. 5454

On winter food of whitefish or observations on the biology
of whitefish caught by ice fishing

T. Turunen

Original title: Siian talvisesta ravinnonkaytosta eli pilkkisiian biologiaa

In: Suomen Kalastuslehti, 5: 240-243, 1988

Original language: Finnish

Available from:
Canada Institute for Scientific and Technical Information
National Research Council
Ottawa, Ontario, Canada K1A 0S2

1989

8 typescript pages



MULTILINGUAL SERVICES DIVISION — DIVISION DES SERVICES MULTILINGUES

TRANSLATION BUREAU

BUREAU DES TRADUCTIONS

Client's No.—N° du client	Department — Ministère DFO	Division/Branch — Division/Direction Sci. Publications	City — Ville
Bureau No.—N° du bureau 3511511	Language — Langue Finnish	Translator (Initials) — Traducteur (Initiales) LT	29/5-89

Timo Turunen,
Research scientist
University of Joensuu
Karelia Research Station
Ecology Department

ON WINTER FOOD OF WHITEFISH
or
OBSERVATIONS ON THE BIOLOGY OF WHITEFISH CAUGHT BY ICE FISHING

Ice fishermen have traditionally concentrated their efforts on perch. However, some other species, such as whitefish, would serve just as well as an object of this winter sport — without any intent to discriminate against perch. Most fishermen must have thought about ice-fishing for whitefish, but it is unfortunate that few have earnestly dedicated themselves to it. The following study deals with the biology of the whitefish ice-fished in Hoytiainen, North Karelia, and also with some ice fishing clues.

The lake Hoytiainen lies in the municipalities of Kontiolahti and Polvijärvi in northern Karelia. Covering an area of almost 300 km², it is one of the largest lakes in Finland. The present fish material was obtained from the southern part of the lake, where the water is very clear and poor in nutrients. In the narrow cove areas of the northern part of the lake, the water is distinctly less limpid

Canada

UNEDITED TRANSLATION
For information only
TRADUCTION NON REVISEE
Information seulement

SEC 5-25 (88-02)

and richer in nutrients. One of the special features of this lake is that its surface level was lowered in 1859, and as the lowering effort partially failed, water escaped to Pyhaselka and the surface dropped by as much as 9 m. The lake lost about 200 km² of its surface area.

The lowering of the lake's water level resulted in significant changes in its fish fauna, as i.a. its native stocks of *Thymallus thymallus* (L.), *Salvelinus alpinus* (L.) and *Salmo trutta* m. *lacustris* (L.) were destroyed. However, today the lake is known for good trout catches based on several stockings. The whitefish (*Coregonus*) stocks are abundant as well. The local fish fauna and the present state of the related fishery have been studied by e.g. Kaijomaa et al. (1985).

The present whitefish material (n = 71) was caught in Hoytiainen in late winter 1987 by Olavi Kyyronen, an enthusiast for whitefish ice fishing. The lengths and weights of the fish were measured, and scale samples were taken for age determination. Growth was determined by back-calculation, using Monastyrski's method (1930). Also, to determine the whitefish type, gill rakers were removed. Stomachs were collected for food analysis.

Whitefish situation in northern Karelia

Four different whitefish types, according to Svardson's classification (1957), are found in the North Karelian waters. The most common of these is pollan (*Coregonus lavaretus*). Its gill raker count on the first gill arch, which is the character most commonly used for distinguishing whitefish types, is about 30. The plankton whitefish (*C. muksun*), with a gill raker count of about 50, is relatively common e.g. in the Orivesi area. It is also considered to be the valuable whitefish of the Vuoksi lake and river system. The humpback whitefish (*C. pidschian*; about 23 gill rakers) is found in North Karelia only in Sarkijarvi (Tohmajarvi) and Pyhajarvi (Kitee), while the houting (*C. oxyrhynchus*; about 40 gill rakers) occurs only in Suomunjarvi (Liekka).

The whitefish in Hoytiainen represents, as for its gill raker count, the pollan type (cf Makinen 1962, Kaijomaa et al. 1985). However, **C. muksun** have been transplanted into this lake as well.

Whitefish as winter catch

The food analyses revealed that the whitefish of Hoytiainen were quite voracious predators : about 70 % of the pollans had fed on fish, which almost entirely consisted of smelts, and no other food types could be found in stomachs that contained fish. Only one stomach was found to contain a **Coregonus** species (whitefish or vendace). In two cases, the whitefish had fed on very small amounts of chironomid larvae. The bottom-living fauna does not seem to play a significant role in the diet of whitefish. About a quarter of the stomachs were empty. In the whole material, the average fullness percentage of the stomachs was 36.

3 - 4 smelts were generally found in each stomach. The maximum was 8. The smelt length ranged from 4.0 to 7.0 cm, which means that they were 1-2 years old. Whitefishes, being small, probably do not prey on fishes bigger than this.

Out of three **C. muksun**, two had been feeding on smelts, while the third (the biggest specimen of the lot) had an empty stomach. **C. muksun** seems to feed on other fish just as eagerly as pollan does.

It is possible that a whitefish catch obtained by ice fishing represents a part of the population that is specialized in eating fish. However, judging by the abundant catches by ice fishing, a majority of the Hoytiainen whitefish stocks belong to this group.

Winter feeding of whitefish has not been studied much, and only sporadic information is available about their predatory nature, because they have been traditionally considered to feed either on bottom fauna, zooplankton, or surface food, depending on their gill raker counts. According to whitefish samples collected (trawl) from Hoytiainen in the summer, pollan does not feed on fish but mainly on surface food items and very small quantities of bottom fauna (Turunen; unpubl.).

Makinen (1962) noted that large (> 500 g) *C. muksun* individuals fed to some degree on fish (vendace, whitefish) in Pyhaselka, while zooplankton constituted their main food in open-water seasons. No information is available on the feeding habits of *C. muksun* during the winter season in Pyhaselka. In Pielisjoki, large whitefish are known to have been caught occasionally by trolling. These have no doubt been *C. muksun* individuals ascending from Pyhaselka to Pielisjoki to spawn. Kliewer (1970) observed that fish is part of the diet of the North American *C. clupeaformis*.

Importance of whitefish in fishery

As far as feeding is concerned, smelt is regarded as the worst competitor of vendace, the most important commercial fish species of inland waters. Control of smelt stocks, which may be locally quite abundant (i.a. in Hoytiainen), is not possible simply by increasing smelt catches, due to the present price level of fodder fish, and thus, the predation of smelt by whitefish is advantageous in view of the fishing industry. The younger smelt age classes in Hoytiainen are obviously being heavily taxed by the abundant whitefish stocks. However, judging by the timing of the ice fishing catches, the predatory phase of the whitefish centers primarily around late winter only.

In Hoytiainen, pollan is a highly valued catch in spite of its small size. Whitefish stocks are under a heavy strain from fishing also in the spawning season. However, at present the fishing could still be intensified without endangering the future stocks.

Growth analyses show that the growth rate of pollan slows down at an early stage, so that particularly the older age classes (starting from the 4th year) could be taxed more heavily. Good possibilities exist e.g. for increasing ice fishing for whitefish. If some of the whitefish fishing effort could be diverted from a use of small-mesh nets towards ice fishing, numerous under-sized transplanted trouts would be saved from destruction.

Ice fishing for whitefish as sport

Ice fishing for whitefish in Hoytiainen is a tradition many decades old. The older fishermen may still reminisce about ice fishermen lying on the ice under white sheets to hide their favorite whitefish holes in the ice. Ice fishing for whitefish has been naturally practised in other Finnish inland waters as well, i.a. in Pyhajarvi (Sakyla), and this practice has spread in recent years to new places, such as Ontojarvi (Kainuu) (A. Huusko; oral comm.). All in all, the numbers of these ice fishermen are, however, small : this may be due to a lack of familiarity with the tricks and possibilities of the sport.

In winter, whitefish generally move in small schools out in the middle of the lake. When the snow cover gets thinner in late winter and lets more light enter the water, schools of smelt rise up to feed on the zooplankton just under the ice. Attracted by the smelts, whitefish arrive to the same areas. The ice fishing season does not start until April, and the catches improve with the advancement of the spring.

Ice fishing for whitefish is usually started in a deep-water area (10 - 20 m) near the bottom, and the lure is raised slowly until it is just under the ice which is where the whitefish most frequently attacks the lure. The lure generally used in Hoytiainen is a large (about 10 cm) shiny vertical lure without snell, while the bait consists of chironomid larvae or a piece of Superlon or cloth, mostly red. Good catches have been had also with balance lures of a smelt-like color, and whitefish is known to go for "mormyshka" as well *(see p. 6 for explan.).

It is good to avoid making unnecessary noise when approaching the fishing place. Whitefish, which are known to be easily scared, will be driven away for some time by snowmobile and drilling noises. The fisherman generally lies on his belly at the hole and looks into it to check the movements and the appetite of the fish.

The average catch of an experienced ice fisherman on Hoytiainen is generally 30 - 70 whitefishes, and the biggest catches, after a full day's labor, may approach 200. Record catches are usually landed on the weak ice of late spring. Even the biggest whitefishes of Hoytiainen rarely weigh a full kilogram, but monsters weighing several kilos are known to have been caught e.g. in Pielisjoki.

Enthusiasts for ice fishing for whitefish are, e.g. in Hoytiainen, very few in comparison with the existing possibilities. The same situation is assumed to exist elsewhere in Finland as well. As it is an interesting and sportive method of catching whitefish, nothing should stop it from becoming a sport practised by larger numbers of ice fishermen.

Sources

Kaijomaa, V-M. 1982. On whitefish populations of Pyhaselka (P-K) and their development. - Joensuu University, Inst. of Biology, Manuscript, 41 p.

Kaijomaa, V-M., Kokko, H., Makinen K. and Kokko. T. 1985. Regional fisheries planning in North Karelia County. Part III. The present fisheries situation. - Joensuu University, Publications of the Karelian Research Institute 66 : 1-123.

...

(German) Monastyrski, G.N. 1930. On methods for determining linear growth in fish on the basis of the scales. - Rept. Sci. Inst. Cult. 584 : 5-44.

...

Photo captions :

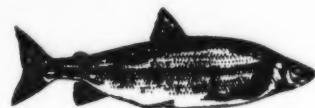
P. 240 : Typical position for winter fishing for whitefish.

Diagram on p. 241 : Length growth of pollan from Hoytiainen. Growth is rapid during the first 2-3 years but slows down fast after that.

P. 242 : A day's catch in Hoytiainen. Catches usually increase in late winter when snow melts from the ice.

* Translator's note : "Mormyshka", on p. 5. The word is taken from Russian and refers to a hook to which a metal weight is attached so that the hook stays in a horizontal position or parallel with the bottom. It may be equipped with feathers.

tä



alan vesistöissä tavain (1957) luokituk-
neljää erilaista siika-
sin näistä on vaellus-
onus (*Lavaretus*), jota
kutsutaan tuppisiiksi
ossa vuoksi. Siivilä-
lukumäärä ensimmäisel-
tella, jota yleisimmin
kattyyppisiä erottavana
tuppisiialla noin 30
riveden alueella tavat-
a on suhteellisen ylei-
tiheäsiivilähampainen
planktonsiika (*Core-
gonus*), jota nimitetään
en vesistön jalosiiaksi.
Coregonus pidschian,
lähemmasta) tavataan
alassa ainoastaan
Särkijärvessä sekä
järvessä ja järvisiikaa
oxyrhynchus: noin 40
sta) ainoastaan Liek-

san Suomunjärvessä.

Höytiäisen siika edustaa siivilä-
hammastihedeltään tuppisiika-
tyyppejä (vrt. Mäkinen 1962, Kai-
joma ym. 1985), mutta järveen on
myöhemmin istutettu myös plank-
tonsiikaa.

Siika pilkkisaaliina

Höytiäisestä pilkillä saadut siiat
osoittautuivat pääasiassa tuppisi-
oiksi. Siivilähammastiheys vaihteli
25–34 välillä keskiarvon ollessa
29.2. Edellisten lisäksi aineistoon
kuului kolme tiheämpisiivilähäm-
paista yksilöä (46, 57 ja 53 siivilä-
hammasta), jotka edustivat siis
planktonsiikatyyppejä. Planktonsi-
ian osuus saaliista oli vain runsas 4
%. Planktonsiikakanta on Höyti-
äisessä alustavien selvitysten (Tu-
runen, julkaisematon) mukaan
suhteellisen heikko.

Tuppisiiat olivat kooltaan var-
sin pieniä (72–303 g); keskipaino
jäi 123 g:aan ja pituus 25.5 cm:iin
(21.9–32.4 cm). Planktonsiioista
yksi poikkesi kooltaan selvästi
muista. Se painoi 570 g ja oli pi-
tuudeltaan 39.4 cm. Planktonsiika
kasvaa tunnetusti tuppisiikaa no-
peammin ja saavuttaa huomatta-
vasti suuremman koon (vrt. Kaijo-
maa 1982).

Iältään tuppisiiat olivat 3–8
vuotiaita. Runsaaimman ikäluokan
muodostivat keväällä 1982 kuoriu-
tuneet, pyyntihetkellä 5-vuotiaat
kalat (40 % saaliista). Huomattava
osa kaloista (noin 70 % oli naa-
raitta).

Taannehtivasti laskettu kalojen
kasvu on esitetty oheisessa kuvas-

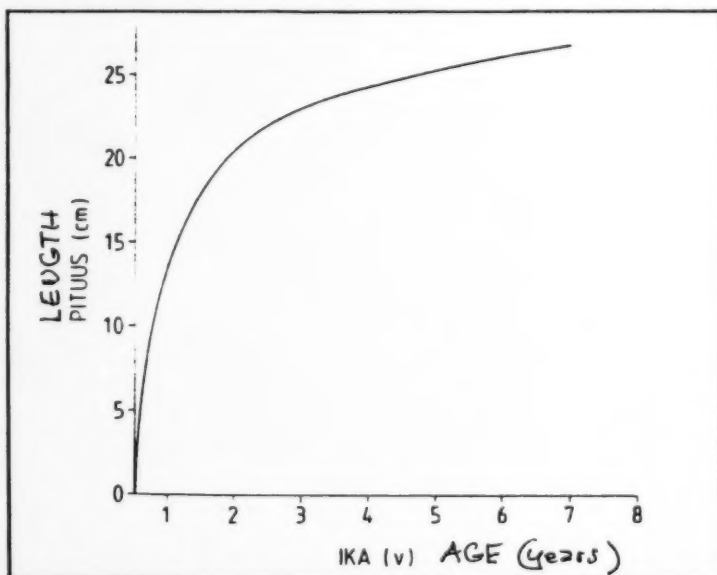
sa. Kasvu on suhteellisen nopeaa
2–3 ensimmäisenä kasvukautena,
minkä jälkeen tapahtuu selvä taan-
tuminen. Kasvunopeuden hidas-
tuminen liittyy mitä ilmeisemmin
sukukypsytyksen saavuttamiseen,
joka ajoittuu yleensä 3. tai 4. kas-
vukaudelle. Tällöin ravinto- ja
energiatalous keskittyy sukutuot-
teiden valmistamiseen eikä kas-
vuun, kuten kalan nuoruusvai-
heessa.

Siian talvinen ravinto

Ravintoanalyysit paljastivat Höyti-
äisen siiat melkoisiksi pedomiksi:
noin 70 % tuppisiioista oli syönyt
kalaa. Kalaravinto koostui lähes

kokonaisuudessaan kuoreista, eikä
kalaa sisältäneistä mahoista todet-
tu mitään muita ravintotyyppisiä.
Ainoastaan yhdessä mahassa to-
dettiin *Coregonus*-suvun laji
(muikku tai siika). Kahdessa ta-
pauksessa siika oli syönyt surviais-
säksken toukkia, niitäkin hyvin
niukasti. Pohjaeläimillä ei näytä
olevan tähän aikaan vuodesta juu-
rikaan merkitystä siian ravintovali-
koimassa. Noin neljäsnes mahois-
ta oli tyhjiä ja koko aineistossa
mahojen keskimääräinen täytei-
syys oli 36 %.

Kuoreita löytyi kustakin mahas-
ta yleensä 3 tai 4 kpl, enimmillään 8.
Niiden pituus vaihteli 4.0–7.0 cm,
joten iältään ne olivat 1–2 vuotiai-
ta. Huomioiden siikojen pienen



Höytiäisen tuppisiian pituuskasvu. Kasvu on nopeaa 2–3 ensimmäisen ikävuoden aikana mutta taantuu sen jälkeen nopeasti.